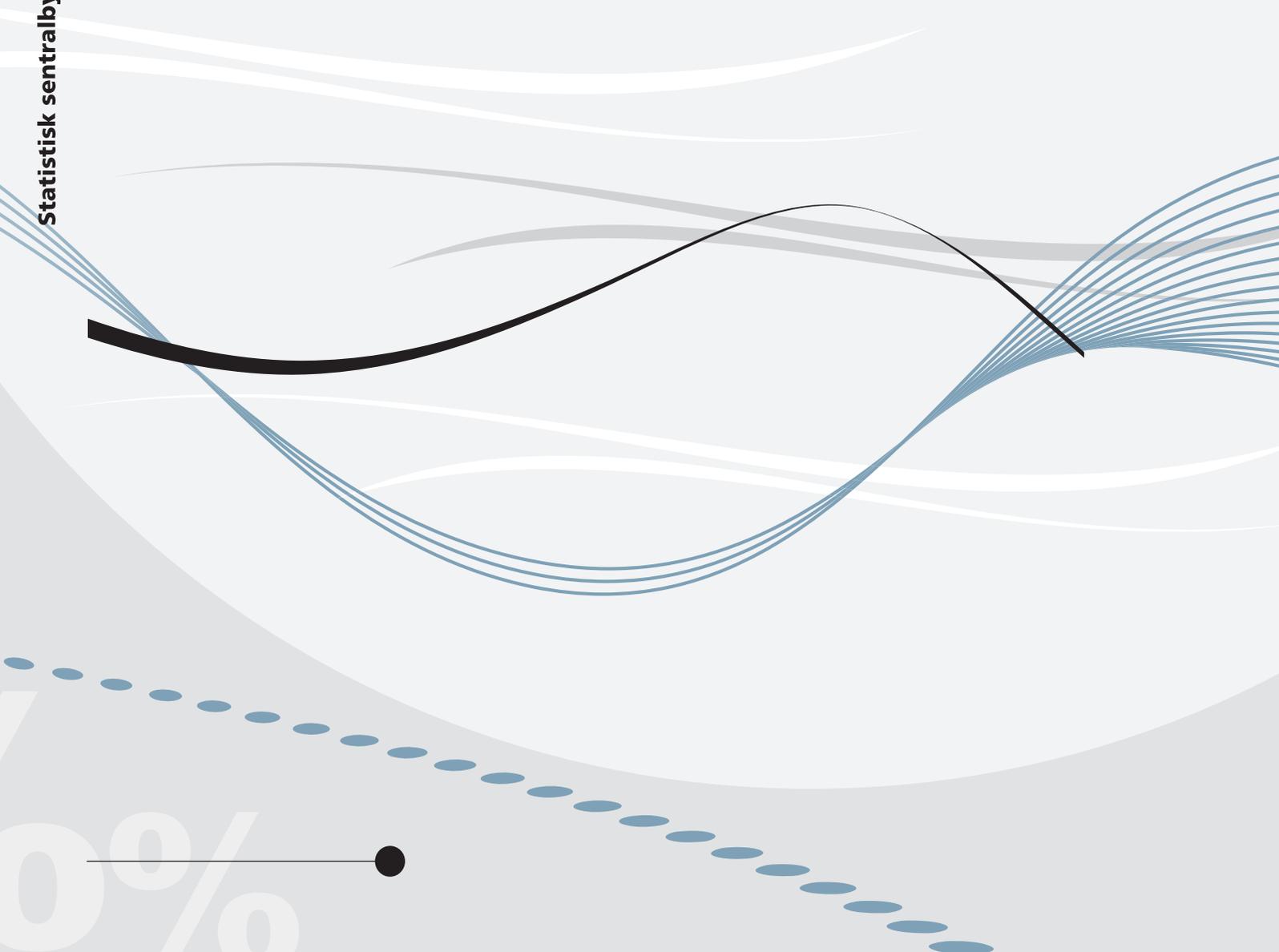Statistics Norway

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Abstract:
This paper focuses on the realization of positive fertility intentions with different time frames. The analyses are based on a unique combination of survey data and information from Norwegian administrative registers on childbearing in the years following the complete selected sample. Guided by the theoretical and empirical framework of the Theory of Planned Behavior (TPB), the results suggest that a fertility intention's time frame is relevant for childbearing behaviour, but the patterns are somewhat different for respondents who were childless at the time of the interview compared to those who already had children. Overall, childless respondents were less likely to realize their fertility intentions than parents. Following the TPB, childless individuals may underestimate the difficulty of acting on their intentions and therefore have more difficulty realizing their intentions, versus parents who take into account their ability to manage another child. The results also show that childless individuals with an immediate fertility intention are more likely to succeed than those with a longer-term intention. Likewise, parents with an immediate fertility intention are more likely to realize their intention during the two first years after the interview, but after four years the childbearing rate was higher among those with longer-term fertility intentions.

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Discussion Papers	comprise research papers intended for international journals or books. A preprint of a Discussion Paper may be longer and more elaborate than a standard journal article, as it may include intermediate calculations and background material etc.

Sammendrag

I denne studien undersøker vi realiseringen av fruktbarhetsintensjoner med ulike tidsrammer i Norge. Analysene er basert på en unik kombinasjon av data fra en spørreundersøkelse og longitudinelle registerdata om barnefødsler for de fire påfølgende årene etter gjennomført intervju. Vi benytter Theory of Planned Behavior (TPB) som det teoretiske rammeverk i analysene. Resultatene indikerer at tidsrammen av fruktbarhetsintensjoner er relevant for fruktbarhetsadferd, men mønsteret er forskjellig for respondentene som ikke hadde barn ved intervju og de som allerede hadde minst ett barn. Blant respondentene uten barn ved intervjutidspunktet er det færre som har realisert sin intensjon om å få barn i løpet av fire år etter intervjuet, sammenlignet med respondenter som allerede var foreldre. En mulig forklaring på denne forskjellen er at personer uten barn undervurderer hvor vanskelig det er å handle i tråd med den formulerte fruktbarhetsintensjonen, mens foreldrene kan basere sine avgjørelser på tidligere erfaring med å ha et barn. Resultatene viser også at respondenter uten barn som ønsker seg et barn nå, har en høyere sannsynlighet for å realisere sin fruktbarhetsintensjon sammenlignet respondenter som har mer langsiktige fruktbarhetsintensjoner. Også foreldrene som ønsker seg et barn nå har i de første to årene etter intervjuet en høyere sannsynlighet for å få et barn til. Men etter fire år er realiseringsraten høyest blant de foreldrene som hadde mer langsiktige fruktbarhetsintensjoner.

Introduction

Research on family size ideals and childbearing behaviour has detected a so-called "fertility gap" in developed countries. This means that country-specific norms of the ideal number of children usually exceed the average number of children in completed families (Goldstein, Lutz, & Testa, 2003). In line with this, research on fertility intentions at the micro level has shown that positive fertility intentions are not always realized and tend to overestimate subsequent childbearing, while negative fertility intentions are a good predictor for the absence of births (for an overview see, for example, Régnier-Loilier & Vignoli, 2011). From both a welfare-state perspective, which is concerned about fertility rate development, and the perspective of individual wellbeing, an important question is why positive fertility intentions are not realized. In this study we contribute with additional insights into how the time frames of a fertility intention influence the realization of such an intention, and our findings suggest that time frame is highly relevant for childbearing behaviour.

We use the Theory of Planned Behavior (TPB), which is a reasoned action approach to explaining human behaviour, as the theoretical framework that guides our analysis. According to TPB a longer time interval between forming an intention and performing behaviour increases the likelihood that other factors will intervene. This might prevent people from acting on their intentions, and the intentions themselves can change as people understand the difficulty of realizing them or, over the longer term, respond to changes in their lives (Fishbein & Ajzen, 2010). The implication is that individuals who express their goal of realizing their fertility intentions in the immediate future should be more likely to have a(nother) child. We therefore compare the childbearing behaviour of individuals with immediate fertility intentions (*want a child now*) with the behaviour of individuals holding longer-term (but still relatively short-term) fertility intentions (*intend to have a child within the next three years*).

The fertility intentions formed by childless individuals and parents are likely to differ in the extent to which they consider the impediments to having and taking care of a child (Miller & Pasta, 1995a). The way in which having children influences the realization of fertility intentions according to defined time frames is another key aspect of our study. Our study is based on unique data from Norway, combining data from the Norwegian Generations and Gender Survey (GGS) from 2007 with data from administrative registers on childbearing histories in the four subsequent years. The great advantage of this approach is that it allowed us to follow the complete initial sample and did not face any attrition, but it should be noted that we were unable to account for other life events that may have changed after the interview.
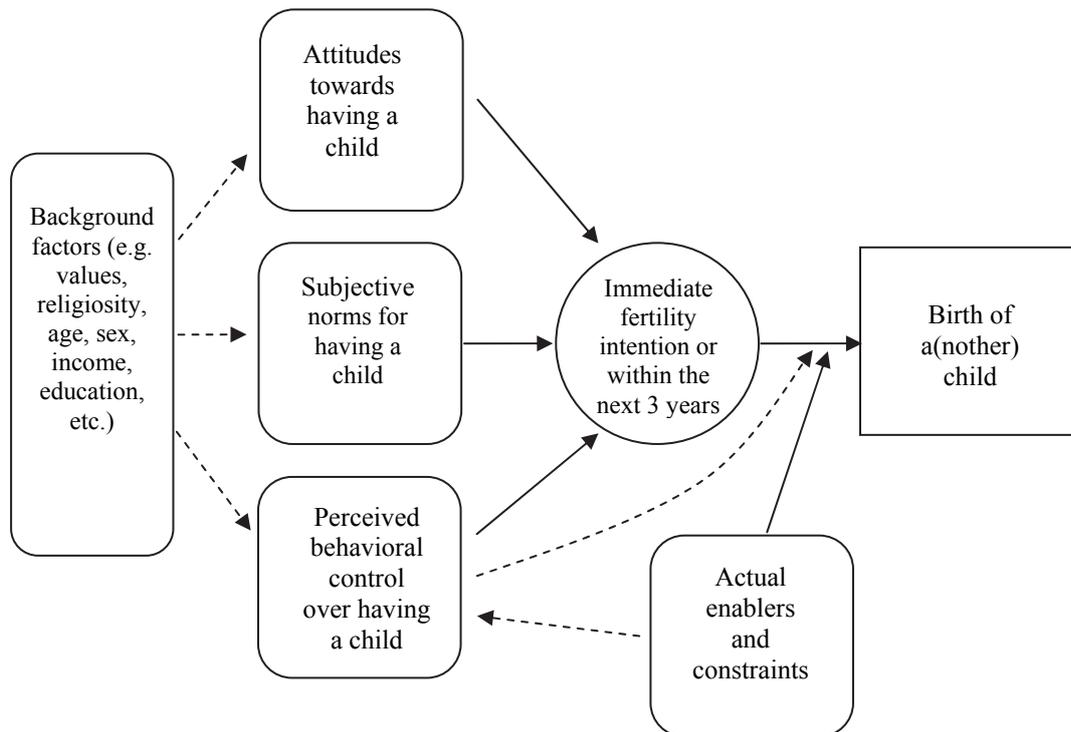
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Background

In recent years, several studies have referred to the TPB model in research on fertility intentions or the realization of such intentions and have implemented parts of the framework in their empirical analyses (Billari, Philipov, & Testa, 2009; Buhr & Kuhnt, 2012; Cavalli & Klobas, 2013; Dommermuth, Klobas, & Lappegård, 2011; Iacovou & Tavare, 2011; Kapitány & Spéder, 2012; Klobas, 2010; Klobas and Ajzen, in press; Kuhnt & Trappe, 2013; Liefbroer, 2005; Mencarini, Vignoli, & Gottard, 2011; Régnier-Loilier & Vignoli, 2011; Spéder & Kapitány, 2009; Testa & Toulemon, 2006). TPB is a social-psychological model used for explaining or predicting behaviour (Ajzen, 1991). Within the model, performing a behaviour or achieving a goal is seen as a reasoned action, as behaviour is based directly on an intention which itself is formed through a process of reasoning (see Figure 1).[1] Intention formation is based on a set of beliefs that form three determinants: *attitudes*, *subjective norms*, and *perceived behavioural control*. Individual characteristics, such as education or values, may shape these three factors. In addition, realizing intentions may be affected by actual enablers and constraints (e.g. low-income status) and may interact with perceived behavioural control (e.g. how the income situation is perceived in relation to goal attainment). Some characteristics may act as background factors affecting the formation of beliefs and the determinants of intentions. Characteristics might also act as actual controls that moderate the transformation of intentions into behaviours (e.g. age can affect attitudes as a background variable, but it also acts as a control variable as fertility declines with age; Cavalli & Klobas, 2013). Furthermore, TPB provides guidance on the definition of compatible intentions as a concrete approach for predicting a behaviour or outcome; e.g. if the outcome to be predicted is the birth of a child, then the appropriate intention is the intention to have a child (i.e. "positive" fertility intention).

In a cross-national comparison based on data from the GGS, Klobas (2010), Ajzen and Klobas (2013), and Klobas and Ajzen (in press) confirm that attitudes, subjective norms, and perceived behavioural control have differential effects on intentions to have a child during the next three years. Parity level differences in Bulgaria are also observed by Billari, Philipov, and Testa (2009), while Dommermuth, Klobas, and Lappegard (2011) find that the three factors are associated with different time frames of positive fertility intentions in Norway.

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[1] It is not necessary that the reasons for intending to engage in the behaviour or achieve the goal are, at the same time, rational (Ajzen, 2011; Fishbein & Ajzen, 2010).

Figure 1. A model of fertility decision-making based on the Theory of Planned Behavior

Note: Adapted from Ajzen and Klobas (2013), own illustration.

Other studies have examined the degree to which different fertility intentions were realized, and even though the level of realization varies across countries, there is a general agreement in the literature that fertility intentions are relevant predictors of fertility (see, for example, Kuhnt & Trappe, 2013; Schoen et al., 1999; Testa & Toulemon, 2006). Particularly negative fertility intentions ('*I don't intend to have a(nother) child*') are usually realized (Noack & Østby, 2000). The consistency between positive fertility intentions ('*I intend to have a(nother) child*') and subsequent behaviour is less strong, but still important. Positive fertility intentions are persistent predictors of fertility, even after controlling for background and life course variables in different institutional settings (Kapitány & Spéder, 2012; Kuhnt & Trappe, 2013; Mencarini, Vignoli, & Gottard, 2011; Miller & Pasta, 1995b; Noack & Østby, 2000; Régnier-Loilier & Vignoli, 2011; Schoen et al., 1999; Spéder & Kapitány, 2009, 2014; Testa & Toulemon, 2006).

Barber (2001) includes the TPB factor *attitudes* and finds that positive attitudes towards children and childbearing increase the rate of marital childbearing in the United States. However, fertility intentions are not included as a distinct measure in Barber's (2001) study. Kuhnt and Trappe (2013) include a measurement for fertility intentions as well as the TPB factor *subjective norms*, referred to as 'social

pressure' in their study. They find that the perception of social pressure, defined as families and friends expressing that the respondent should have a(nother) child, increases the likelihood for childbearing among those with a positive fertility intention. This is inconsistent with TPB, which assumes that the effect of social pressure should be channelled through the fertility intention rather than having its own direct effect on childbearing. Based on panel data from Italy, Mencarini et al. (2011) include fertility intentions, all three TPB factors, and different control variables in a model on fertility behaviour. In line with the TPB model, they do not find a direct effect of the TPB factors on fertility behaviour, while intention has a strong impact on subsequent childbearing.

Fewer studies address the impact of specific time frames of fertility intentions on subsequent childbearing. Based on data from the United States, Miller and Pasta (1995b) include seven different time frames of fertility intentions (from within a year up to over five years). By including other measures of fertility intentions, namely child-number intentions and childbearing desires, Miller and Pasta compare how different measures of fertility intentions are associated with actual childbearing behaviour. Their findings suggest that the time frame of fertility intentions is the strongest predictor for childless individuals and its importance somewhat diminishes once a first child has arrived. Schoen et al. (1999) use a similar approach, but only distinguish between fertility intentions within four years and beyond four years. Their findings point to a higher realization rate for those with a shorter time frame to their intention, although the time frame's influence is relatively weak compared to the certainty of the fertility intention. Likewise, Testa and Toulemon (2006) discover that measurements of the certainty of fertility intentions are more strongly associated with subsequent childbearing than different time frames of fertility intentions. The three last studies also include negative intentions and their non-realization in their analysis. People with positive and negative fertility intentions represent two rather different groups and including them in the same model might bias the results.

Focusing on positive fertility intentions, previous studies suggest that childless individuals realize their intentions to a lesser degree than parents (Kapitány & Spéder, 2012; Kuhnt & Trappe, 2013; Noack & Østby, 2000; Quesnel-Vallée & Morgan, 2003; Régnier-Loilier & Vignoli, 2001; Testa and Toulemon, 2006). Individuals with a partner are more likely to realize positive fertility intentions than singles (Spéder and Kapitány, 2009, 2014), and union stability has a similar positive effect (Kapitány & Spéder, 2012; Kuhnt & Trappe, 2013; Mencarini, Vignoli, and Gottard, 2011). It also appears that age has a negative influence on the likelihood of realizing fertility intentions (Quesnel-Vallée & Morgan, 2003; Testa & Toulemon, 2006). Higher socio-economic resources, education, and job security are

also found to increase the likelihood of realizing positive fertility intentions (Testa & Toulemon, 2006; Régnier-Loilier and Vignoli, 2011).

Except for one Norwegian study that combines survey and register data (Noack & Østby, 2000), most studies are based on several waves of a survey. The fertility intention measurement is retrieved from the first survey wave and information on childbearing behaviour from later waves. Often, such studies only indicate whether or not a(nother) child was born after the first wave, and the lag between the waves varies between two to five years. These studies have not focused on whether results are sensitive to the length of the observed period or how childbearing develops across the observed period. This is also the case when different measures for the time frame of fertility intentions are applied. In this paper we are able to investigate this in more detail and ask how different time frames of fertility intentions shape the timing of entering parenthood and of subsequent childbearing.

Although previous studies underline the differences between childless individuals and parents in realizing fertility intentions, both groups are usually included in the same analytical model. Small sample size may be the pragmatic reason for including both groups in the same model, and in particular the problem of attrition in higher-order waves may be a cause of small sample sizes. The selectivity in attrition may be a source for biased results. Attrition is not an issue in our analysis, as childbearing behaviour has been retrieved from the administrative register for the entire initial sample. Thus, a comparatively large sample allows us to study childless individuals and parents in separate models.

Data and methods

We use data from the Norwegian GSS 2007 supplemented with the subsequent birth histories of all respondents extracted from the Population Register. The Norwegian GGS is a nationally representative survey based on telephone interviews with a response rate of 60% (N = 14,891) (Lappegård & Veenstra 2010). Information from administrative registers is linked by a unique ID number, and complete birth histories for the four years following the interview have been added to the dataset. Thus, in this study we include the date of the first birth that occurs within four years after the interview. This can be the respondent's first child or another sibling to previous children. As all births in Norway are reported to the Population Register, the data do not suffer from the usual problem of attrition in panel data.[2]

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[2] It should be noted that the father is unknown for around 3.5% of all children born, which means that childbearing among men is underestimated to some degree.

The sample is defined by extracting women and men of childbearing age (18–40 years) at the time of interview. Respondents in this age group who were not pregnant (themselves or their female partner) but confirmed the physical ability to have children, were asked if they intended to have a(nother) child within the next three years. Table 1 provides an overview of fertility intensions and actual births within four years after the interview. Among the respondents holding a negative fertility intention, only 8% had a(nother) child, while the majority (57%) of those holding a positive fertility intention had a(nother) child in the subsequent four years (left column in Table 1). Our sample includes this group, and we investigate the association between differences in the time frame of positive fertility intentions and childbearing.

Table 1. Intentions to have a(nother) child within three years and actual births in the subsequent four years *

		Intention to have a(nother) child within three years		
		Yes	No	Don't know
Birth within four years after the interview	Yes	57%	8%	26%
	No	43%	92%	74%
All (N)		100% (1.448)	100% (3.414)	100% (378)

* Respondents aged 18-40 years, physically able to have children but not pregnant at the time of the interview

Of the 1,448 respondents with a positive fertility intention within the next three years, 146 cases are excluded due to missing values of key indicators from the survey (142 cases) or due to emigration out of Norway after the interview (4 cases). The selected sample therefore includes 1,302 respondents (see Table 2). The incident and the date of a(nother) birth within this time frame serves as the dependent variable in the analyses.

Our main independent variable measures the time frame of the fertility intention. In addition to holding a longer-term fertility intention ('*want a(nother) within the next three years*'), almost half of the respondents in our sample also answered 'yes' to the question '*Do you want a(nother) child now?*' and thereby expressed an immediate fertility intention (see Table 2). According to the TPB, a shorter time frame of an intention should be associated with a higher likelihood of realizing the relevant behaviour, provided the intention has taken appropriate account of impediments to the behaviour, because it is less likely that other events will intervene to prevent realization. Therefore, one could expect that parents who hold immediate intentions would have a higher realization rate (e.g. higher proportion with actual births) than parents with longer-term intentions. A similar pattern might be expected for childless individuals, although with a lower realization rate given their lack of experience with childbirth and childrearing. Previous research on the formation of fertility intentions supports this

assumption: The birth of a first child, which marks the transition to parenthood, is a qualitatively different step in the life course than the transition to a second child or a higher parities (Miller, 2007), and childless individuals formulate fertility intentions differently than parents (Dommermuth et al., 2011). In addition, for some it may be physically difficult or impossible to have children. It must be noted that our sample includes only respondents that were not aware of any such childbearing hindrances for themselves or their partner. It is likely that such hindrances are higher among childless individuals than among parents, as the latter already have proved their ability to have at least one child. We ran separate models for these two groups, which allowed us to compare the association between the background variables and the childbearing behaviour among childless individuals and parents, and we included distinct measures (e.g. income categories) for the two groups in the models.

TPB suggests that attitudes, subjective norms, and perceived behavioural control are the antecedents of intentions or the time frame of intentions, but these should not be related to the behaviour itself (see Figure 1). In order to provide new insight into the decision-making process in fertility behaviour, we test this TPB aspect by adding these three factors into our analysis. The GGS includes three blocks of questions to capture the background factors of fertility intentions according to TPB (Vikat et al., 2007). In the Norwegian GGS, each factor is evaluated by at least three questions (in total 23 items), with an answering scale from 0 to 10 (Lappegård & Veenstra, 2010). Based on an explorative factor analysis, four factors (based on 20 items) were constructed: *(i)* positive attitudes, *(ii)* negative attitudes, *(iii)* subjective norms, and *(iv)* perceived behavioural control.[3] Table 2 includes the mean score of each TPB factor for each interviewed person with and without children.

The factor for perceived behavioural control is based on nine questions that evaluate the degree to which respondents thought that their decision to have a(nother) child during the next three years depended on different circumstances (financial situation, housing situation, availability of childcare, opportunity to go on parental leave, life situation of parents, one's own and partner's employment, and health status). The perception of the importance of these circumstances might be mutually influenced by the respondent's actual situation, labelled as 'actual enablers and constraints' in the TPB model (see Figure 1). Based on the data from 2007, six distinct measures for these actual enablers and constraints could be included: income, employment status, dwelling size, health status, union status, and age (see Table 2).

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[3] For the results of the factor analysis and the exact composition of the factors, see Dommermuth et al., 2011, Table 2.

Table 2. Dependent and independent variables for childless individuals and parents at time of the interview

	Childless individuals	Parents
Birth of a(nother) child within four years after the interview	51%	68%
Immediate fertility intention ('*Want a(nother) child now*')	47%	50%
Factors of TPB (mean value)		
Positive attitudes	7.2	6.6
Negative attitudes	4.8	4.9
Subjective norms	5.3	5.1
Perceived behavioural control	5.7	6.0
Income after tax of respondent (NOK p. year)		
1. quartile	up to 158000	up to 214000
2. quartile	158000 – 241500	214000 – 274000
3. quartile	241500 – 305500	274000 – 328000
4. quartile	more than 305500	more than 328000
Employment situation		
Permanent position or self-employed	73%	78%
Temporary contract	17%	12%
Not employed	10%	11%
Housing situation		
No available room	24%	33%
One available room	35%	28%
Several available rooms	41%	39%
Health status of respondent: *Serious illness or bad health*	11%	11%
Union status of respondent		
Single	26%	5%
Non-residential union	23%	4%
Cohabitation	38%	45%
Marriage	13%	46%
Respondent's age		
18-24 years	25%	7%
25-29 years	37%	29%
30-34 years	25%	39%
35-39 years	12%	24%
Intended number of children		
One (more) child	4%	69%
Two (more) children	62%	27%
At least three (more) children	34%	5%
Respondent is a women	52%	53%
Level of highest education		
Compulsory education	18%	16%
Secondary education	35%	40%
Tertiary education	47%	45%
Number of children and age of youngest child		
No children	100%	0%
One child, 0-3 years		53%
One child, 4 years or older		16%
Two or more children, youngest 0-3 years		23%
Two or more children, youngest 4 years or older		8%
N (%)	755 (58%)	547 (42%)

The respondent's income after tax in the year of the interview was used as a measure for economic situation, and income quartiles were created for parents and childless individuals separately, as parents have on average a higher income than childless individuals (see Table 2). The respondent's employment status at the time of the interview was included to control for the employment situation, and the variable consisted of three categories: *(i)* being employed in a permanent position or being self-employed, *(ii)* holding a temporary position, and *(iii)* not working (including students, the unemployed, and a few, mostly female, homemakers). To include an objective measure for the housing situation, we created a variable by combing the number of household members and rooms in the dwelling and distinguishing between three categories: *(i)* no available room, *(ii)* one available room, and *(iii)* two or more available rooms.

The measure for health status is based on respondents' own evaluation of their health status. Respondents who reported bad health or a serious illness and stated that this illness limited them in their daily activities were coded with '1' in the corresponding dummy variable.

Union status includes both non-residential and co-residential unions. For childless individuals, we created three categories: *(i)* single, *(ii)* non-residential unions, and *(iii)* co-residential unions. The latter category includes both cohabitation and marriage, as relatively few childless individuals were married (see Table 2). Among respondents with children, only relatively few had no partner or a non-residential partner (see Table 2), and we integrated these two union statuses into one category *(i)* in the analysis of the parents, while cohabitations *(ii)* and marriages *(iii)* were treated separately. Finally, age at the time of interview was included as a measure of actual enablers and constraints. We distinguished between four age groups: 18–24, 25–29, 30–34, and 35–40 years.

In addition to these independent variables related directly to TPB, several socio-demographic background variables were included in the models: sex and highest level of education (compulsory education, secondary education, and tertiary education, i.e. university colleges and universities), the number of children (still) wanted, and for parents a combination of the number of children and the age of the youngest child. Table 2 shows that the selected sample includes slightly more female than male respondents. All respondents were asked how many children they still expect to have. For childless individuals, we differentiate between those who wanted one child, those who wanted two children, and those who wanted three or more children. For parents, we distinguish between those who wanted one more child and those who wanted at least two more children. Furthermore, information on the actual family size of the parents (number and age of children) was available. We combined this information
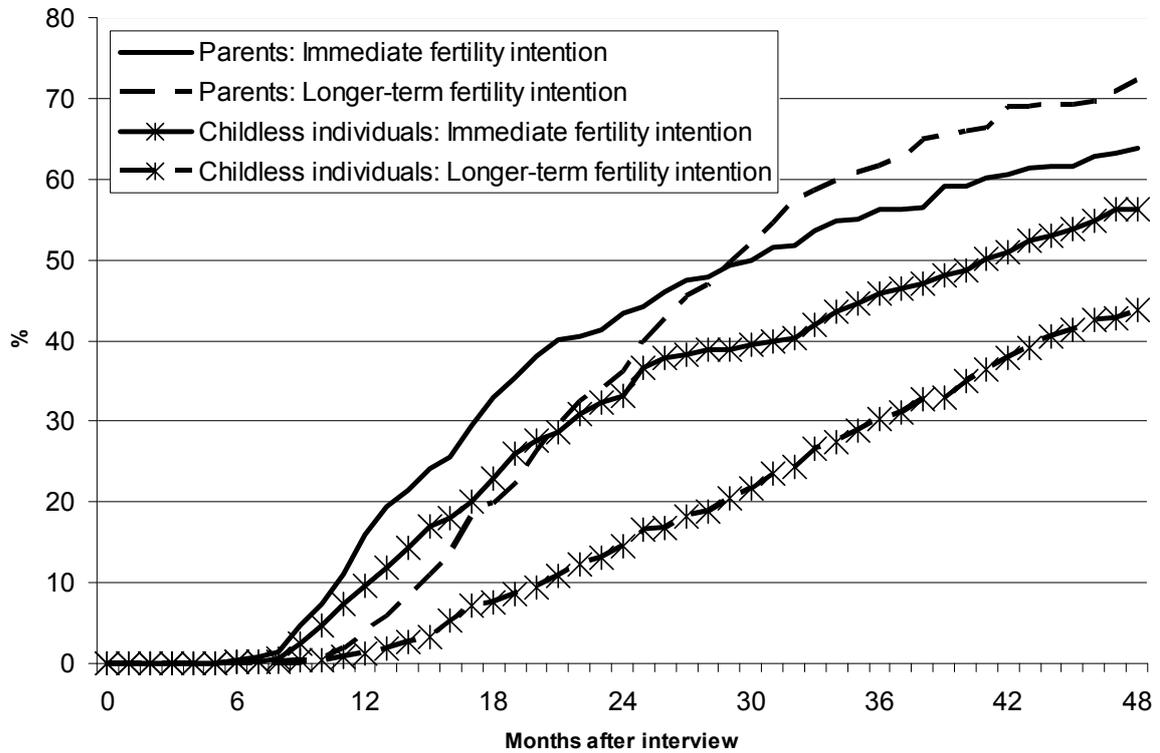
into one variable with four categories: *(i)* one child, three years or younger, *(ii)* one child, older than three years, *(iii)* two or more children, youngest child three years or younger, and *(iv)* two or more children, youngest child older than three years.

The time between the interview and a possible birth in the four subsequent years is the dependent variable in the analyses. In a first step, we describe the timing of childbearing after the interview by the time frame of the fertility intention based on so-called life tables. In a second step, Cox regression models (Cox, 1972) are applied to estimate the association between the independent variables and the tempo of childbearing in the 48 months after the interview. A dummy variable indicating whether or not a birth has occurred serves as a censoring variable, and those without a birth were followed up at the end of the four-year period. As the selected sample does not include pregnant respondents or those with a pregnant partner, no births were registered in the first months after the interview. To avoid a confounding effect of this time period without any event in the Cox regression models, we exclude the first eight months after the interview. The few children who were born between 6 to 8 months after the interview are coded with a value of 1 (which then equals 8 months after the interview). In total, 58% of the respondents in our sample had a(nother) child within four years after the interview, and the realization of the fertility intention was higher among parents (68%) than among childless individuals (51%).

Results

Figure 2 displays the cumulative share of respondents who had a(nother) child within four years after the interview. As pointed out above, we only include respondents with a positive, longer-term fertility intention in our sample, but they are separated by whether they hold an immediate fertility intention or not. The figure shows that parents, more so than childless individuals, realize their fertility intentions independent of the time frame of the intention. The time frame also seems to influence the realization rate differently for childless individuals and parents. More childless individuals with an immediate fertility intention experienced the transition to parenthood (57%) compared to childless individuals with a longer-term intention (45% had their first child). Also, the proportion of first births increases faster among those with an immediate fertility intention and stays constantly above that of those with a longer-term intention. This result is in line with the TPB, in that the shorter time frame of the intention is associated with a higher realization rate.

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Figure 2. Births within four years after the interview, by parity and the time frame of the fertility intention

Among parents, the picture is similar at the beginning of the observed period, as those with an immediate fertility intention had a higher realization rate until two and a half years after the interview compared to those with a longer-term intention. After this point, the realization rate increased more rapidly in the latter group, and the lines cross 29 months after the interview. By the end of the four-year period, 72% of respondents with a longer-term fertility intention had another child, compared to 64% of those with an immediate intention.

Using Cox regression models, we investigated whether the described differences in realization by the time frame of the intention were significant, and we tested whether and how the other independent variables are associated with fertility outcomes. Results for childless individuals are presented in Table 3 and for parents in Table 4. Each table includes three models. Model 1 includes only the time frame of the fertility intention as an explanatory variable. In model 2 we add the four factors of the TPB and the related measures of actual enablers and controls, while model 3 includes all independent variables. We report the hazard ratios which can be interpreted as the relative chance for a(nother) birth, as well as the standard errors.

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Looking at model 1 for childless individuals at the time of the interview (Table 3), the time frame of the fertility intentions is significantly associated with the transition to parenthood in the following four years. The hazard for a first birth is about 55 percent higher among those with an immediate fertility intention compared to those with only a longer-term intention. This association remains significant in model 2, when controlling for the TPB factors and actual enablers and controls, and is even stronger in model 3 (hazard ratio of 1.77), when including all independent variables. This indicates that the positive association between an immediate fertility intention and the transition to parenthood is not confounded by the TPB factors, actual enablers and constraints, or other socio-demographic variables.

In line with the TPB model, we find no significant association between the factors of the TPB and subsequent childbearing. To be sure, we also ran an additional model including only the measures for subjective norms, perceived behavioural control, and positive and negative attitudes, showing that the TPB factors are not significantly directly associated with the transition to parenthood (results available on request).

Income seems to be positively related to the realization of the fertility intentions, as the hazard ratio of the two highest-income quartiles (compared to the lowest-income quartile) is greater than one, and the difference between the lowest and the highest income quartile is significant in model 2. Once we control for the other background variables, especially the highest level of education, the coefficient of the highest-income quartile is no longer significant.

Somewhat surprisingly, those in temporary employment at the time of interview have a higher hazard ratio (1.35) compared to those with a permanent position or those who are self-employed. One explanation is that most people start off as temporarily employed when they are getting established in the labour market, and for many this is also the time for getting established with a family.

According to the results, neither housing situation nor health status is significantly associated with the transition to parenthood, while union status at time of the interview is strongly associated with becoming a parent. As expected, singles have a significantly lower chance of realizing their fertility intention (hazard ratio of 0.54 compared to non-residential unions in the final model), and living in a co-residential union is positively related to realization (hazard ratio of 1.49 compared to non-residential unions). Union status is the most important independent variable when comparing the explanatory power of the independent variables in the model (likelihood ratio chi square of 66.61 for testing the null hypothesis). This reflects some differences in actual control: in general, having a

partner gives more opportunities to have sexual intercourse, and couples might also be able to pool resources that provide greater control for having a child.

Table 3. Childless individuals at the time of the interview: Proportional hazard models of childbirths within 48 months, Hazard ratio (standard error).

	Model 1		Model 2		Model 3	
Time-frame of the fertility intention (*ref. longer-term fertility intention*)						
Immediate fertility intention	1.55***	(0.10)	1.72***	(0.11)	1.77***	(0.11)
Factors of the TPB						
Positive attitudes			1.08	(0.06)	1.10	(0.06)
Negative attitudes			0.97	(0.05)	0.97	(0.05)
Subjective norms			0.92	(0.06)	0.92	(0.06)
Perceived behavioural control			1.06	(0.05)	1.07	(0.06)
Income after tax (*ref. 1. quartile*)						
2. quartile			0.97	(0.16)	0.97	(0.16)
3. quartile			1.38	(0.17)	1.34	(0.18)
4. quartile			1.49*	(0.19)	1.38	(0.20)
Employment (*ref. permanent- or self-employed*)						
Temporary contract			1.39*	(0.14)	1.35*	(0.14)
Not employed			1.17	(0.20)	1.13	(0.20)
Housing situation (*ref. no available room*)						
One available room			1.00	(0.14)	1.01	(0.14)
Several available rooms			0.93	(0.14)	0.93	(0.14)
Health status (*ref. no serious illness/bad health*)						
Serious illness or bad health			0.85	(0.18)	0.87	(0.18)
Union status (*ref. non-residential union*)						
Single			0.56**	(0.18)	0.54**	(0.18)
Co-residential union			1.53**	(0.14)	1.49**	(0.14)
Respondent's age (*ref. 25-29 years*)						
18-24 years			1.02	(0.15)	1.07	(0.15)
30-34 years			0.84	(0.14)	0.83	(0.14)
35-39 years			0.45**	(0.21)	0.46**	(0.22)
Intended number of children (*ref. one child*)						
Two children					1.40	(0.32)
At least three children					1.48	(0.33)
Sex of the respondent (*ref. men*)						
Women					0.86	(0.12)
Level of highest education (*ref. secondary education*)						
Compulsory education					1.03	(0.16)
Tertiary education					1.20	(0.13)
N			755			
n with a birth in the observed period			384 (51%)			
Generalized R^2	0.02		0.14		0.14	

*p < .05. **p < 0.01. ***p < 0.001.

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Moreover, the respondent's age seems to play a significant role in the pathway from fertility intentions to a first birth. Respondents older than the reference group (25–29 years) are less likely to realize their fertility intention, but only the hazard ratio (0.46 in model 3) of respondents aged 35–39 years differs significantly from the reference group. This reflects the decline in actual control in the form of ability to have a child as people age.

Among childless individuals the results show no significant association between the number of expected children, the sex of the respondent, or highest level of education and the realization of their fertility intentions (see Table 3).

Time plays a crucial role in our analyses, but on different levels (e.g. time frame of the intention, length of the observed period after the interview, age of respondents). Therefore we examined this aspect thoroughly to ensure the robustness of the results. One assumption of Cox regression models, the proportional hazard assumption (ph-assumption), presupposes that the effect of each covariate does not vary over time. It must be noted that Cox regression models still provide valid and relevant estimations when this assumption is not fulfilled (Allison, 2010). If the covariate's effect varies over time, the hazard ratio does not capture the exact variation during the observed period, but rather displays an average effect over the range of time observed in the data (Allison, 2010). Such a mean effect of a covariate over time is usually of central interest. Nevertheless, testing for the ph-assumption can provide more insight into the process from fertility intentions towards childbearing.

Among childless individuals, a test for the ph-assumption reveals that the effects of two independent variables fluctuate over time. First, those with an immediate fertility intention are more likely to have a first child in the first twenty months after the interview compared to those with a longer-term fertility intention. After this period, the transition to parenthood slows down in the group with an immediate intention and becomes more similar to the development of the latter group. This development in childbearing across the observed period is also visible in Figure 2. Second, the test for the ph-assumption shows that the childbearing rate of the oldest respondents (35–39 years) varies over time.[4] In this group we find the lowest proportion, with a first birth four years after the interview. However, at the beginning of the observed period (up to 15 months after the interview), a relatively high proportion of respondents of the oldest age groups, versus the younger respondents, actually made the

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[4] It is also possible to account for the non-proportionality by including time-dependent covariates (interactions between the time and the specific variables) in the model (Allison, 2010). Doing so did not change the results for the other independent variables in the model and supported the described variations over time of independent variables. The models including the time-dependent variables are available on request from the corresponding author.

transition to parenthood. One possible explanation for this variation is that the oldest respondents were aware that their age could limit the time period in which they would be able to become a parent and therefore they might have been more certain of their intention and more committed to realizing it while conditions were favourable (i.e. while they were still able to exercise control).

The results for parents (see Table 4) differ in several ways compared to the results for childless individuals. This is already visible in the first model, as the hazard ratio that compares parents with and without an immediate fertility intention is not significant. This implies that the mean effect of the time frame of the fertility intention does not differ significantly among parents. However, a test for the ph-assumption indicates that the effect of this variable fluctuates over time, which is again visible in Figure 2. Parents with an immediate fertility intention were more likely to have another child at the beginning of the observed period compared to those with longer-term intentions. However, after four years, the realization rate is higher among those with longer-term intentions. This indicates that the parents were quite realistic about the time frame of their fertility intention. Those with an immediate fertility intention fairly often realized this intention within a relative short time frame after the interview, but if this was not possible, the intention was abandoned comparatively often. The other group of parents, those with a more long-term fertility intention, was less likely to have another child shortly after the interview, but had a higher realization rate four years after the interview.

Among parents, the factors of the TPB are not significantly associated with subsequent childbearing in model 2 or 3. It must be noted, however, that in additional models where either only the four TPB factors or the factors and the time-frame of the intention are included, the 'subjective norms' factor is positively associated with subsequent childbearing (significant at the 0.05 level). Subjective norms measure how the individual perceives what parents, relatives, and friends think about them having another child. The positive relationship of this factor with childbearing indicates that those who perceive their close social network to be supporting them have a higher realization rate of their fertility intentions than those with lower levels of perceived support. This positive association is no longer significant when controlling for actual enablers and constraints.

Regarding the variables measuring actual enablers and constraints, the results of model 2 in Table 4 indicate that a higher income is positively associated with realization of fertility intentions among parents. But when controlling for the other independent variables in model 3, this association is no longer significant. A housing situation without an available room at time of the interview is negatively associated with having another child. There is no significant association between the health situation

of the respondent and subsequent childbearing. It must be noted that all respondents in our sample expressed a positive fertility intention, which means that even respondents with comparatively bad health thought that they would be able to take care of a(nother) child.

Union status among parents is also the most important actual enabler or constraint. Parents living in cohabitation serve as the reference category, and compared to this group, singles or those with a non-residential partner have a significant lower hazard for realizing their fertility intention (41% compared to the reference group). The hazard ratio of 1.19 for married in model 3 peaks in the opposite (i.e. positive) direction, but does not differ significantly from those in cohabitation.

Age is significantly associated with subsequent childbearing, but the pattern is slightly different compared to childless individuals. As shown in model 3, parents aged 25 to 29 have the highest hazard ratio (in contrast with the youngest age group among childless individuals; see Table 3), and those at older ages are less likely to realize their fertility intention. Again, this pattern reflects declining control of fertility with age, but only the hazard ratio (0.67) of the oldest age group (35–39 years) differs in a statistically significant way from that of the reference group in the final model.

While we find no significant association between the respondent's sex and the timing of subsequent childbearing, the other independent variables are significantly associated with subsequent childbearing. Parents who wanted at least two more children had another child sooner, and their intentions to have a child were realized more often than those of parents wanting only one additional child. This seems logical, as people with a preference for large families need to have several children in the same time window as people who want only one more child.

Parents with a tertiary education have a significant positive hazard ratio (1.41) for subsequent births compared to those with a secondary education. Finally, we control for number of children and the age of the youngest child. Compared to respondents with one child aged at least four years (reference group), those with one younger child were more likely to realize their fertility intention within 48 months after the interview (hazard ratio of 2.12 is significant at the .01 level).

Table 4. Parents at the time of the interview: Proportional hazard models of childbirths within 48 months, Hazard ratio (standard error).

	Model 1		Model 2		Model 3	
Time-frame of the fertility intention (*ref. longer-term fertility intention*)						
Immediate fertility intention	0.93	(0.10)	0.983	(0.11)	1.11	(0.12)
Factors of the TPB						
Positive attitudes			1.07	(0.06)	1.09	(0.06)
Negative attitudes			0.95	(0.06)	1.01	(0.06)
Subjective norms			1.06	(0.06)	1.02	(0.06)
Perceived behavioural control			0.96	(0.05)	0.98	(0.06)
Income after tax (*ref. 1. quartile*)						
2. quartile			1.17	(0.16)	1.16	(0.16)
3. quartile			1.48*	(0.16)	1.37	(0.18)
4. quartile			1.42*	(0.16)	1.23	(0.19)
Employment (*ref. permanent- or self-employed*)						
Temporary contract			1.38	(0.17)	1.41	(0.16)
Not working			0.83	(0.20)	0.84	(0.20)
Housing situation (*ref. no available room*)						
One available room			1.26	(0.14)	1.34*	(0.14)
Several available rooms			1.15	(0.13)	1.16	(0.13)
Health status (*ref. no serious illness/bad health*)						
Serious illness or bad health			0.86	(0.19)	0.92	(0.19)
Union status (*ref. cohabitation*)						
Single or non-residential partner			0.32***	(0.27)	0.41***	(0.28)
Marriage			1.21	(0.11)	1.19	(0.11)
Respondent's age (*ref. 25-29 years*)						
18-24 years			1.03	(0.22)	0.95	(0.23)
30-34 years			0.74*	(0.13)	0.80	(0.13)
35-39 years			0.61**	(0.16)	0.67*	(0.17)
Intended number of children (*ref. one more child*)						
At least two more children					1.29**	(0.12)
Sex of the respondent (*ref. men*)						
Women					0.93	(0.13)
Level of highest education (*ref. secondary education*)						
Compulsory education					0.96	(0.18)
Tertiary education					1.41**	(0.13)
Number of children and age of youngest child (*ref. one child, 4 years or older*)						
One child, 0-3 years					2.12**	(0.19)
Two or more children, youngest 0-3 years					1.32	(0.21)
Two or more children, youngest 4+ Years					1.52	
N			547			
n with a birth in the observed period			372 (68%)			
Generalized R^2	0.00		0.11		0.18	

*p < .05. **p < 0.01. ***p < 0.001.

The test for the ph-assumption shows that, in addition to the time-varying effect of the time frame of the fertility intention, the variables measuring housing situation and the combination of the number of children and time since last births do not meet the assumption.[5] Further analyses reveal that respondents who had at least two available rooms had higher childbearing rates at the end of the observed period than those without a free room, confirming that lack of housing space is a real constraint on having another child. Among families with two children, where the youngest is under four years old, the realization rate declines over time, perhaps because parents are somewhat discouraged by the increasing age gap between siblings.

There is a possibility that event history models produced biased results in this study, as we lacked information prior to the survey. To check the robustness of our results, we ran logistic regression models, where a dummy variable measuring a(nother) birth in the observed period served as the dependent variable. The results of the logistic regression models and the Cox regression models are very similar (results not shown, available on request). The estimates peak in the same direction, with one non-significant difference,[6] and the same variables have a significant effect on the outcome variable, and just the level of significance differs in some cases. Using event history methods has therefore provided stable results and new insights. Not only can the outcome at the end of the observed period be discussed, but also the development during this time window.

Besides the dependent variable measuring childbearing behaviour, all the applied measures are based on the data from the Norwegian GGS in 2007. Also, these measures can change after the interview, and changes might have a distinct impact on fertility behaviour. As there is no second wave of the Norwegian GGS, we are not able to control for such changes, but the main purpose of this study is to investigate the impact of differences in the time frame of a fertility intention on subsequent childbearing. A major advantage of our data is that we are able to follow the entire initial sample, as the data for childbearing are based on administrative register data, and therefore we do not suffer the usual problem of attrition of panel studies based on several survey waves.

Results of analyses of fertility behaviour that are based on survey panel data indicate that having a partner and union stability are important factors for childbearing decisions (Kapitány & Spéder, 2012; Kuhnt & Trappe, 2013; Mencarini, Vignoli, and Gottard, 2011). As all respondents in our sample

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[5] Accounting for non-proportionality by including time-dependent covariates (see footnote 4) did not change the results. These models are available on request from the corresponding author.

[6] The coefficient for the time frame of the intention peaks in the opposite direction in the model for parents.

expressed a positive fertility intention, we chose to also include singles in our analysis. If we had excluded singles from the analysis, this would have led only to minor changes in the results of the parents, as only 5% did not have a partner at time of the interview (see Table 2). Most importantly, this reduction of the sample increases the proportion with another birth from 68% to 70%. Among childless individuals, 26% were single at the time of the interview (see Table 2). Excluding this group increases the proportion of those who had a first child within four years after the interview from 51% to 58%. This growth is equally distributed among those with an immediate and those with a longer-term fertility intention. The results of the Cox regression model including all independent variables change only slightly if we exclude singles among the childless (results available on request). The independent variables are similarly associated with subsequent first births. Only the hazard ratio of respondents with temporary employment no longer differs significantly from the reference group. Once singles were excluded from the analysis, we were left with respondents in non-residential unions (reference group), cohabitations, and marriages. Results indicate that those living in cohabitation have a significantly higher hazard ratio than the reference group, while the other groups do not differ significantly from each other.

Discussion

This paper focuses on the realization of fertility intentions with different time frames among childless individuals and parents at the time of interview. Based on unique data from Norway, combining survey data from 2007 and information from the administrative register on childbearing in the four subsequent years for the complete sample, insights from the Theory of Planned Behavior are applied in the analyses. Results indicate that the time frame of the fertility intention is relevant for the childbearing behaviour of both childless individuals and parents, but the association is different in the two groups.

Among the childless, an immediate fertility intention is positively associated with the transition to parenthood. This group was more likely to become parents especially in the period shortly after the interview, and they also had a higher realization rate four years after the interview compared to those with longer-term fertility intentions. This is in line with the TPB, as the risk that intentions are not realized increases with the time interval between the intention and the behaviour (Fishbein & Ajzen, 2010).

Interestingly, the pattern among parents at time of interview is different. First, more parents than childless individuals realized their fertility intention (68% vs. 51%). It seems that the experience

gained from already being a parent enables parents to have more achievable fertility intentions than childless individuals. In addition, parents were more often in a co-residential relationship, and the fact that they already had children shows that they were physically able to have children. Second, parents, versus those without children, were more likely to act in line with the expressed time frame of the fertility intention. If parents had an immediate fertility intention, they comparatively often had the child in the beginning of the observed period or abandoned their intention. If the parents had longer-term fertility intentions, relatively few had a child right after the interview, but many realized their intention in the second half of the observed period. In general terms of the TPB, this means that the goal attainment of people with prior experience (in this case, of childbearing) is less disturbed by intervening conditions and events than that of people who have no previous experience with it. Time frames of intentions, expressed on the basis of earlier experience (in this case, by parents), are achievable projections for the timing of future behaviour. By contrast, the time frame of an intention expressed by people without earlier experience (here, the childless) can be interpreted as an expression of commitment to the intention, or level of certainty that they will act, and is associated with a higher likelihood of goal attainment.

These findings can be integrated with a more general discussion about the realization or non-realization of fertility intentions and childlessness. Taking the increase in childlessness in many modern societies as a starting point of such a discussion, the presented results show that fertility intentions with a shorter time frame are better predictors for the transition to first parenthood than fertility intentions with a longer time frame. Previous analysis based on the same survey data demonstrates that the perceived support from significant others (subjective norms) and the perceived level of control play important roles (Dommermuth et al., 2011). Childless individuals who perceived support for their fertility intentions were more likely to want a first child now and not only within three years. Also, those perceiving that their actual life situation allowed them to become parents were more likely to express an immediate fertility intention. Together with the findings presented here, which show that immediate fertility intentions are associated with a higher hazard ratio for first births, this means that childless individuals can be supported in their fertility decision-making process, which can increase their chances of becoming parents. Likewise, results based on German panel data (Kuhnt & Trappe, 2013) indicate that supportive surroundings and a secure life situation can increase the chance for realizing positive fertility intentions among the childless.

One advantage of the present study is that the data do not suffer from the usual problem of attrition of survey panel data. Through the combination of survey data and information from administrative

registers, we were able to follow up on the childbearing behaviour of the entire initial sample. Other than data on childbearing, however, no other longitudinal data could be included, such as changes in the relationship or health status or the fertility intention. At the same time, we are confident that changes in these background variables most likely would have no confounding effect on our main finding regarding the distinct association between the time frame of positive fertility intentions and childbearing behaviour of parents and childless people. Changes in, for example, the income situation or health status should not be very distinct in either of the two groups, and there is no reason to expect that these conditions would affect either group differently. It is rather the question of how individuals change or adjust their fertility intentions over time. Earlier research shows that individuals switch between positive or negative pregnancy intentions (Miller, Barber, & Gatny, 2013) or adjust the number of children they wish to have (Buhr & Kuhnt, 2012; Iacovou & Tavare, 2011; Liefbroer, 2009). As most young people intend to become parents, a promising approach could be to focus on individuals with positive fertility intentions and investigate how they adjust the time frame of their positive birth intention in response to other events or at which point fertility intentions are abandoned.

The analyses presented here show that the Theory of Planned Behavior provides valuable, new insight into the development and realization of fertility intentions. Applying event history methods, the results also reveal that the length of the observed time frame can affect the conclusions one might draw when studying the realization of fertility intentions. If we would have followed up on the respondents for only two or three years after the survey, the picture would have been different from the results based on the observed four-year period. Still, we cannot be certain that the behaviour would change again with an even longer period. But by describing the exact timing of the births, rather than just comparing whether or not a birth happened at the end of the period, we call attention to the connection between time frame and childbirth.

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